

A Project in
Operation Blackboard

**AVAILABILITY AND USE OF
BLACKBOARDS, CHALKS, DUSTERS,
MAPS, GLOBES AND CHARTS IN
PRIMARY SCHOOLS**

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PREFACE

The National Policy on Education 1986 contains this Statement :

"A phased drive, symbolically called Operation Black Board will be undertaken with immediate effect to improve primary schools all over the country" para (5.7)

The objective of the "Operation Blackboard" is to provide minimum essential facilities including at least two reasonably large rooms and the necessary blackboards, maps, charts, toys and other learning material. A comprehensive list of essential facilities has been mentioned in the Report of Task Force(IX) on Elementary Education. The specific items included in these facilities with which the Graphic, Exhibition & Printing Division of the CIET is concerned are as follows :

- i) Blackboards, chalks & dusters
- ii) Maps - district, state, country
- iii) Globes
- iv) Charts

We have begun necessary spadework in respect of these items. As a first step we have collected information about the types of materials mentioned above, available in the country. Manufacturers/dealers having sole selling rights and institutions developing any of these materials were invited to send particulars of their products for wider dissemination and for their purchase by the Central/State Governments and educational institutions all over the country. Requisite proformas on which the information for each item was to be collected were developed and sent to manufacturers/dealers mentioned in the directory of the A.V. materials earlier developed by the CIET. The proformas were also sent to the state agencies like Secretaries of Education, DPs, SCERTs, SIEs, Field Advisers of the NCERT etc. This is the report based on the responses to our questionnaires about the description, availability and preparation of these materials in the country. Chapter I deals with blackboard, chalk and duster, Chapter II deals with map, Chapter III deals with globe and Chapter IV deals with chart.

I am pleased to record that Dr. Tilak Raj, Dr. S.P. Mullick, Shri K.K. Chainani and Shri M.R. Grover have developed this report at a time when it is needed most by those who are implementing Operation Blackboard.

(M.M. Chaudhri)

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CHAPTER I

BLACKBOARD CHALK AND DUSTER

INTRODUCTION

The blackboard is a vehicle for visual materials. It is used in different instructional situations. The main purpose is to display symbols-visual and verbal-usually for a short period of time. To put something on the board is to make it visible to the entire class from where they are sitting. It is a piece of apparatus in the hands of the teacher to convey the visual messages. The chalkboard requires very little advance preparation for use and mistakes which are made may be easily removed. It provides an opportunity as no other aid can, for creativity and initiative. Blackboard may also be used for display of other material.

Blackboards are the mainstay in education. Every school requires them. Sometimes they are referred to as chalkboards because they can also be painted green, mid-grey or any light coloured plastic or matsurface. In addition to wood and plywood, they are made of glass, plastics, asbestos sheets and other materials. They are manufactured in a variety of ways.

In the National Policy on Education (1986), the blackboard has been rightly recognised as one of the most essential commodity for any school. Under the "Operation Blackboard" each primary school of India must have two reasonably large rooms that are useable in all weather conditions. More often than not each of these rooms would have at least one immovable blackboard fixed in its wall. In addition to fixed blackboards, a primary school must have sufficient number of movable blackboards. In order to assist administrators and educationists to procure suitable blackboards and accessories like chalks, dusters, the publication of a manual on the specifications for making and using blackboards in the country, along with a questionnaire, developed in 1987 have been prepared and distributed. In continuation of making the preparation of blackboards a state subject, the Department of Education, Government of India, has been making efforts to develop suitable blackboards for use in schools in the country.

TYPES OF BLACKBOARDS

The modern version of the blackboard has a variety of forms. It varies from the smooth flat surface of quarried slate in older schools to the pastel-shaded, dull-surface chalkboard area which is beautifully fitted into the general decorative scheme of the modern classroom. Between these extremes are the dull-finish, paint-coated surface of wood or composition board, the etched plastic surface, the mossy-finish glass pane, and the vitreous-coated steel board. The commonly used blackboard is made of wood. Chalkboards made of glass, PVC and asbestos sheets are also gaining popularity.

WOODEN BLACKBOARDS : These are the most common variety obtainable in the market. Their sizes vary from as small as 20cm X 30cm to as large as 120cm X 200cm. But the three sizes viz. 60cm X 90cm, 90cm X 120cm and 120cm X 180cm are most popular. In a good blackboard, the writing space is in one piece. It is generally fitted in a wooden frame. A few manufacturers are now a days manufacturing blackboards in aluminium frames as well. Some frames are fitted with hooks for hanging on the walls, others are kept on easels. The easels are the folding stands with pegs on which the board rests. They are made of wood or of steel. (See Fig. 1)

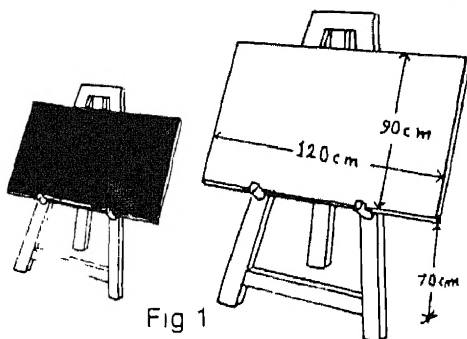


Fig 1

OTHER VARIETIES : The former Department of Teaching Aids now merged in the Central Institute of Educational Technology had conducted a workshop to develop designs of black boards to suit specific pedagogic purposes. A few designs are presented here.

i) *Rotating inclined boards :* The sketch is drawn in Fig. 2. The top

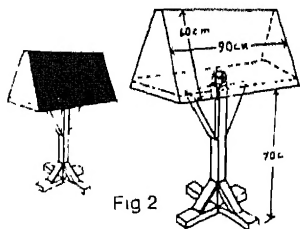
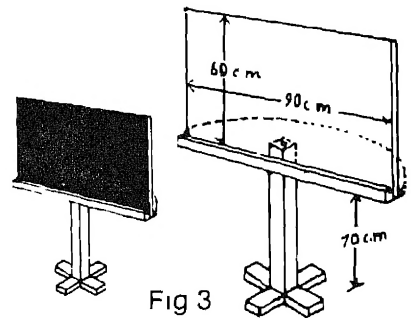


Fig 2

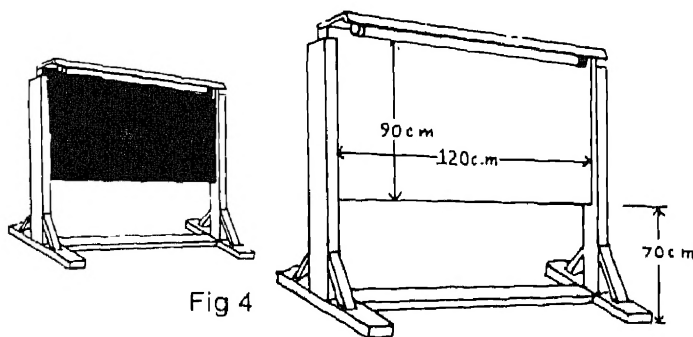
structure provides two smooth surfaces. It moves on ball bearings on a stand smoothly. The duster and chalk pieces can be kept inside the space enclosed by the boards.

ii) *Board with object holder*: The teacher needs some space to hide models and materials to be shown to students at a particular point of time in the class room. For this purpose a blackboard may be made as shown in Fig. 3. The top



structure in this case also is fixed to a stand on ball-bearings. The sketches can be made on one side, while the relevant objects, specimens or models can be kept hidden on the projected plank on the otherside. These may be exposed to the learners at the proper psychological moment.

iii) *Board with tube light*: Many a times classes are held in nonformal education centres or in schools when there is insufficient light. For this purpose a blackboard may be prepared as shown in Fig. 4. At the top of the



surface of the board is fitted a fluorescent tube light under a steel hood. In case of insufficient light in the place of teaching the fluorescent tube may be lighted.

(iv) *Rotating board* : It is a board in which both the sides can be used by the teacher alternately. (See Fig. 5)

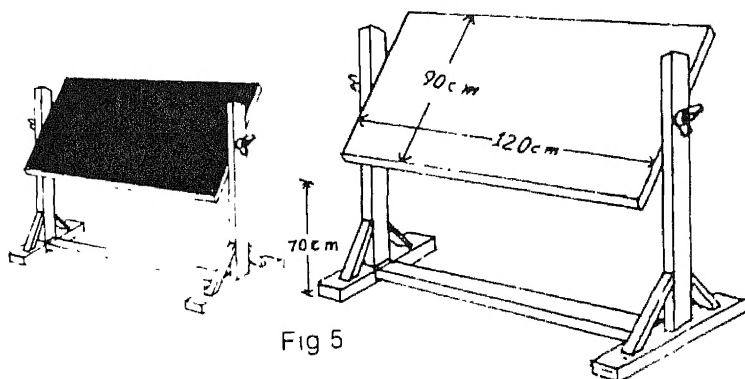


Fig 5

(v) *Multipurpose stand with Removable board* : A stand may be made in such a way that it has a top to place any learning materials and it has space to fit boards which may be removed if necessary (See Fig 6)

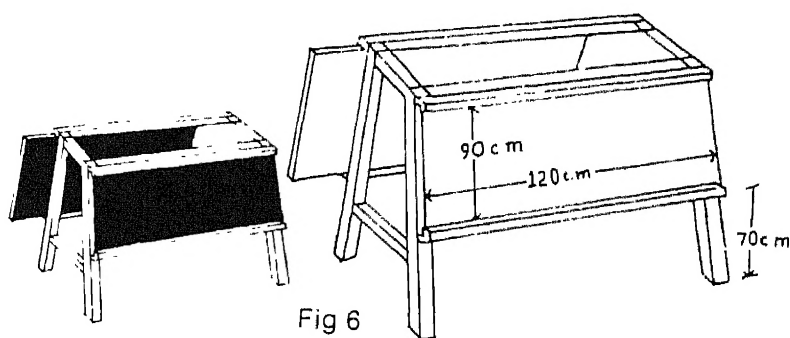


Fig 6

ROLL UP BLACK BOARDS : These are available on thick jet black PVC sheets. (See Fig 7) They are quite cheap, durable, attractive and easy to carry,

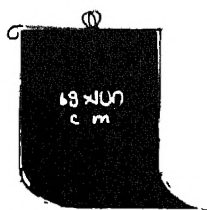


Fig 7

store and display. On a good quality board, chalk writes very smoothly and can easily be cleaned by an ordinary cloth or brush type cleaner/duster. They are available in many sizes like 68cm X 100cm and 100cm X 135cm. Now a days graph roll up PVC boards are also available. On them, graph centimeters in tricolours showing squares of 1cm, 5cm, and 10cm are shown. They may be used by a teacher for making accurate diagrammes and illustrations. (See Fig.8)

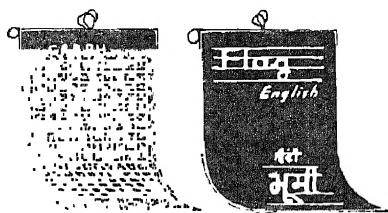


Fig 8

For teaching writing skills in a language, lined roll up boards are also available. For teaching English alphabets, four lined sheets are available and for teaching Hindi alphabets another set of four lined sheets are available. (See Fig 8). For teaching other scripts, suitable permanent lines may be drawn on the PVC boards.

PVC sheets can be used in a variety of ways to present learning materials to the students. In a workshop organised by the former Department of Teaching Aids, a few boards using this material were developed, as explained below.

(i) *Board with movable wooden pieces* : A wooden frame which can be hung on a wall as shown in Fig 9 may be developed. In this board the PVC sheet may be moved to and fro. A teacher may write the text and draw sketches in advance, which may be pulled out by the teacher at a psychological moment while giving a lesson.

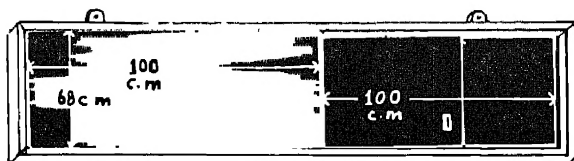


Fig 9

(ii) *Board with cellotax piece for bulletin board* : It may be seen in Fig. 10.

On the cellotax sheet picture and related graphic materials can be displayed. In science teaching, charts may be displayed on one side while the details may be worked out step-by-step on the board.

(iii) *Board with perforated masonite sheet* : It may be seen in Fig 11. The

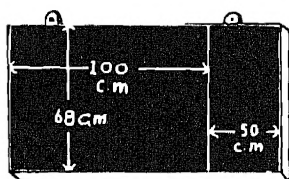


Fig 10

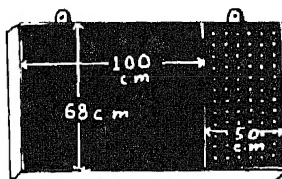


Fig 11

perforated hardboard base can be used as a peg board. With special wire hooks, books, three dimensional objects etc. can be fixed on the peg board.

GLASS BOARDS : A piece of glass of thickness generally varying between 4mm to 6mm is rubbed with sand stone to make its surface rough. It is generally painted green on the other side. The chalk leaves its impression when rubbed on the rough surface. The glass boards are available in wooden frames with hold fasts etc. to be fitted into a wall. They are durable and need no polishing as frequently as needed in wooden blackboards.

ASBESTOS SHEET BOARDS : Plain asbestos sheet mounted on a piece of commercial ply board can also be used as a blackboard. It may be painted green or blue. Its rough surface is an ideal surface for writing with a chalk on it.

EFFECTIVE USE OF BLACKBOARD

For hundreds of years the blackboard has been a basic means of instruction. All during this time, teachers have been using it with varying degrees of success. Too often they have shunned its use because they feel that they are not artistic. This need not be the case. Our purpose, here is to describe blackboard techniques which are easily and effectively used and which are within the ability of any teacher.

PLACEMENT OF BLACKBOARD : New demands for light reflection in the classroom and avoidance of dark areas are being successfully met by the new light-coloured chalkboards. The best of them give good visibility, are durable, and contribute to the attractiveness and eye comfort of the classroom. Such light chalkboards should replace blackboards. Two to three lineal meters of

immovable chalkboard is generally sufficient for an average classroom. In class room situations demanding specialized use of the movable blackboards, adjustments in terms of size, position in relationship to viewers, and other considerations call for its special placement. Regardless, however, of its many forms, a well placed blackboard in a classroom has the following characteristics :

1. The whole class can see it comfortably.
2. It has no glare when seen from any part of the room at the point of time when the period is on.
3. It is mounted so as to be within the arms reach of the teacher from below and above and when children are required to use them, it should be within easy arms reach of a pupil.

If necessary, depending on the size of the room and the materials to be presented, two blackboards placed side by side may be used with advantage (See Fig 12)

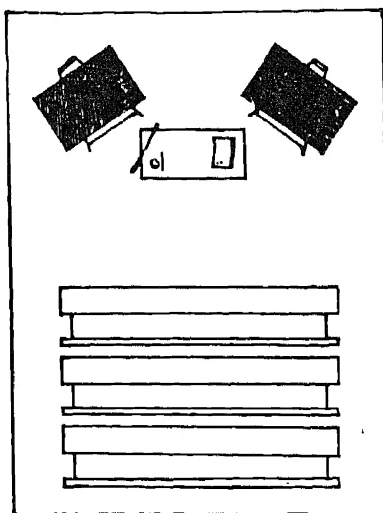


Fig 12

SELECTING THE BLACKBOARD SPACE : Choose a section of the blackboard which can be easily seen by all the children. The angle from which the children view the blackboard must not be too acute; they should have as "front-on" a view as possible. In all cases, portions of the blackboard which reflect a light glare from windows or artificial sources should be located; the situation should be corrected by means of sun curtains, changes in seating, additional artificial lighting, or replacement of the blackboard surface with the new glare proof material. Use the following simple test in choosing the best blackboard space :

Write a few words or draw a simple sketch on each blackboard pannel (This may seem repetitious, but it is practical and worth while.) Walk around the room and view the entire blackboard space from at least five key positions in the seating area. The presence of glare caused by unfortunate angles of light and seating will be apparent. On the basis of your test, determine the space on which the words and drawing are completely and comfortably visible

USING THE SPACE : A basic understanding of lettering, of preparing the chalk, of making simple line drawings and of creating more complex visualisations, will provide any teacher reasonable facility in providing myriad learning experiences to children who work under his guidance.

Good order and neatness on the blackboard will help maintain attention and facilitate quicker understanding of the message being put across. Written information, drawing and illustrations in any space must always be legible and clear. The space should not be overcrowded with writing or drawings. All unwanted writing must be erased from that space. Letters should be 5-7 centimeters high. The teacher should assess writing and drawings from the rear of the class to see if they are sufficiently clear and can be seen without strain on the part of the children. The teacher should stand away from the blackboard space when children are taking notes so as not to block them.

USE OF COLOUR : Whenever appropriate, colour chalks may be used. Not only is colour appealing to the eye but also lends clarity and emphasis to the writing or drawing. Colour chalks differ in quality and colour density. Pale colours are more effective than dense ones, and some are easier to see than others. The most important factor to consider when selecting colours is clarity.

USE OF RULERS AND COMPASSES : Blackboard rulers and compasses are normally available in stationery shops. Where these are not available, however, it is easy to improvise for them. In the case of blackboard ruler, a flat piece of wood about 1 metre long and 7cm wide can serve as a board ruler. As for a compass, a string loop stretched between a finger held in contact with the board and the chalk can serve as an effective substitute.

PRESENTATION OF MATERIALS ON THE BOARD : Some times it is useful to present visual materials in stages. If a teacher is using movable board, he may prepare the material in advance but turn away the face of the board. He may show the material at most appropriate time. If the blackboard is fixed permanently, then the teacher may use a curtain suspended from a string and arranged in such a way that it falls accross the front of the board. The curtain

may be drawn back, stage by stage to reveal material already prepared (See Fig 13)

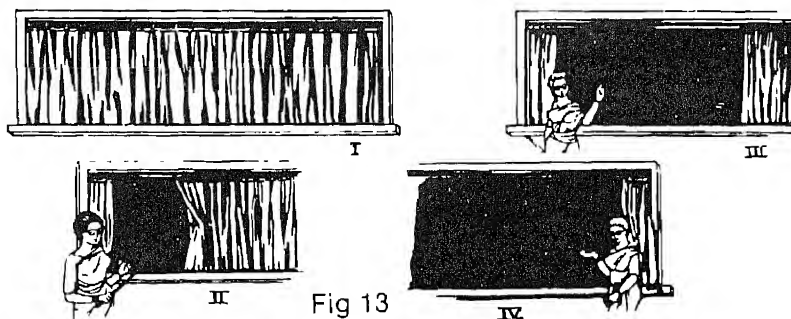


Fig 13

Some time illustrations may be drawn on the board by chalk and then lightly erased by a felt duster so that they are only visible to the teacher at close range but not to children. During presentation the material can be lined in, so that, they are visible to the whole class. Another technique is the grid method where drawings are made on a piece of paper for each illustration that will be presented on the board. Using a paper punch or a perforating machine, the illustrations are perforated in outline at 2cm intervals. When the complete drawing has been punched out, the pattern is held against the chalkboard and a chalky duster is rubbed firmly across the perforated section of the outline. In this way, an outline of chalk dots appears on the board, which can be connected freehand with a chalk.

BLACKBOARD MAINTENANCE : The blackboard should always be kept clean. When materials presented on it are no longer required, they should be wiped off immediately. Felt dusters should be used preferably. When the felt material on the duster is worn out, it should be replaced to avoid the wooden block of the duster causing damage to the blackboard surface. Chalk dust from the duster should be beaten out frequently. Final cleaning of the board should be done with vertical strokes of the duster. If chalk dust still remains on the board after cleaning with a felt duster, a damp cloth should be used to wipe the board. Whenever the surface of the board becomes worn out or glossy, fresh paint should be applied to give it a uniform dark background. The board should not be exposed to the sun for long periods.

AVAILABILITY OF BLACK BOARDS : A proforma seeking information about different types of black boards being manufactured and supplied to educational institutes was sent to manufacturers/dealers mentioned in the directory earlier developed by the CIET as well as to the state agencies like Secretaries of education, DPIs, SCERTs, SIEs, Field advisers of the NCERT etc. Thirty eight manufacturers/dealers have responded to our circular. Out of them 26 have stated that they manufacture and/or deal in blackboards. A list of these manufacturers/dealers is given in the Appendix. This is not exhaustive list and is being updated by further correspondence and search.

PRICE OF A BLACKBOARD :

Prices are not uniform. They vary according to the material used as well as according to the quality. The prices are apt to differ from place to place according to fluctuations in local markets. The questionnaire data have been analysed and approximate prices of blackboards in 1987 are given in Table I. They may be treated as broad guidelines and decisions for purchase of blackboards may be taken by examining local factors as well as quality and quantity of purchase at a time. The materials when purchased in bulk are cheaper, further rebates are allowed, if the payment is made instantly.

Table 1

Based on the information provided by the dealers/manufacturers, the approximate prices of Blackboards :

<u>S.No.</u>	<u>Description of Black Board</u>	<u>Size</u>	<u>Price</u>
1.	Made of wood and with wooden frame and with wooden easle.	90X120cm	Rs. 200
2.	Made of wood and with wooden frame and with steel easle.	90x120cm	Rs. 250
3.	Made of wood and with wooden frame and with hooks for hanging on walls.	90x120cm	Rs. 160
4.	Made of wood and with Aluminium frame with wooden easle.	90x120cm	Rs. 210
5.	Made of glass with modern frame to be permanently fixed on the walls complete with holdfast etc.	120x120cm	Rs.1,260
6.	Roll up Blackboard made of PVC black sheet complete with wooden rollers for hanging on walls.	100x135cm	Rs. 35

CHALKS

Chalks are the sticks by which teacher writes content and makes illustrations on the blackboard. They are manufactured from a mixture of whiting and a binder. High quality chalks usually contain a higher percentage of this whiting. It is poor economy to buy a chalk which may cost a few paise less per box but which contains lesser amounts of whiting. The ingredients in some cheaper grades of chalk are in themselves abrasives which wear away the

surface of the chalkboard. A good chalk has the following qualities:

- It does not break easily. It is neither crumbly nor extremely hard.
- It writes easily and brightly.
- It does not split too much dust.
- It is manufactured from harmless material.
- It does not leave smudges.

The use of coloured chalk should be encouraged for at least two reasons. Colour is both pleasing and intrinsically interesting to students. More important, there are many cases in which meaning and understanding can be increased by means of colour. Coloured chalk is specially made for chalkboard use. Different coloured chalks produce differential effects when used on different coloured surfaces.

The following table may serve as a rough guide.

Colour of chalk \ Colour of board	WHITE	YELLOW	RED	LIGHT BLUE	GREEN	BROWN	DARK BLUE
BLACK	Very good contrast Standard for general work	Good contrast Good for adding interest to board Good for adding colour to drawings and for underlying key words				Poor Not quite effective	Very poor
DARK BLUE				Poor	Fair		
GREEN		Very good	Fairly good		Not visible		Fairly good
DARK GREEN		Contrast			Fair		

For using coloured chalks effectively, it may be useful to draw a diagram that includes two or three colours and test the degree of contrast by viewing the diagram from various parts of the room. By this means a teacher can decide on the most effective colour combinations.

AVAILABILITY OF CHALKS .

A proforma seeking information about chalks being manufactured and supplied to educational institutes was sent to manufacturers/dealers mentioned in our directory as well as to the state agencies like Secretaries of Education, DPs, SCERTs, SIEs, Field Advisers of the NCERT etc. A list of 12 manufactures/dealers of the chalks who responded to our questionnaire is given in the Appendix. This is not an exhaustive list and is being updated

PRICE :

The chalks are generally available in a box of eighty chalks. The price of a box containing white chalks varies between Rs.1 50 - Rs.2.00 and the price of coloured chalks varies from Rs.4 00 - Rs.5 00.

DUSTERS .

Blackboard duster is generally a piece of rough cloth of size 45 x 45cms. It is also made of wood of size 12 x 5cms on which a felt piece is fixed with an adhesive. Now a days blackboard duster s made of plastic with foam are also available. The dusters made of plastic and foam are long lasting.

The dusters made of wood with felt are cheaper as compared to those made of plastic. The dusters made of cloth are also long lasting. They can be used to clean the blackboard after rinsing in water. The price of different types of dusters are

a	Plastic with foam	Rs. 4 00 each
b.	Wood with felt	Rs.3.00 each
c.	Cloth of size 45 X 45cm	Rs.3.00 each

A list of 19 manufacturers/dealers who responded to our questionnaire is given in the Appendix.

CHAPTER II

MAP

INTRODUCTION :

Maps are flat representation of earth's surface. Because the earth's surface is spherical, a flat representation of any portion of that surface gets distorted in terms of area, distance, direction and shape. Hence by nature maps are abstract. Their language is one of symbols, lines, colours, names and space relationships. A dot fixes the location of a city. A line of one type means a highway, another represents a political boundary, still others designate rivers, rail, roads, trade routes, elevation and natural boundaries between water and land, direction or other features.

Maps of India are published by the Survey of India. They have published large size (183 x 165cm) maps of India and adjacent countries in multi colours. Their latest publication shows states and district boundaries. All the roads, railways, principal industries, mineral and geology products are also shown. (See Fig. 14). They have also published Railway, Road, Political and Physical

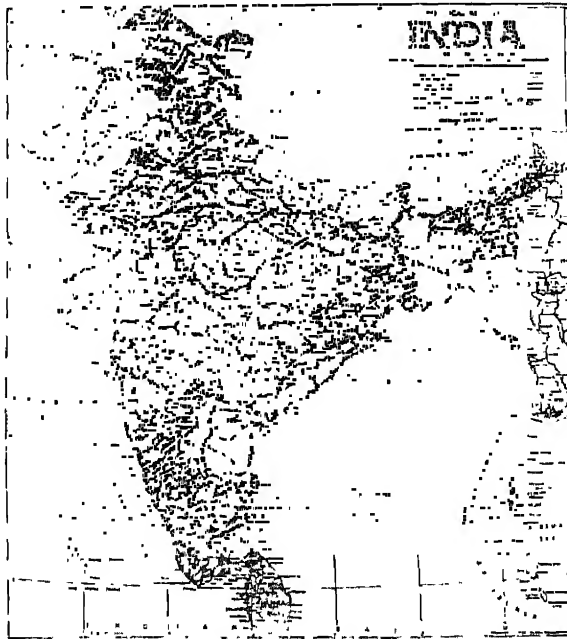


Fig. 14.

maps of India. They have published individual state maps of India and some town guide maps like Abu, Agra, Allahabad, Almora, Aligarh, Bangalore, Chandigarh, Delhi, Hyderabad, Kanpur, Kulu, Lucknow, Mathura, Masoorie, Pondicherry, Secundrabad, Simla, Trivandrum, Madras, Pune and Varanasi etc. They have published outline maps of varying sizes showing (i) plains, (ii) with state boundaries and (iii) with major rivers.

Most of the publishers and manufacturers mount the maps published by Survey of India on cloth, varnish and fix rollers to them. Any publishing concern, who develops its own map has to get it approved by the Survey of India, who have developed topographic sheets of every square shown in Fig. 15. These sheets may be consulted for developing any map on the basis of

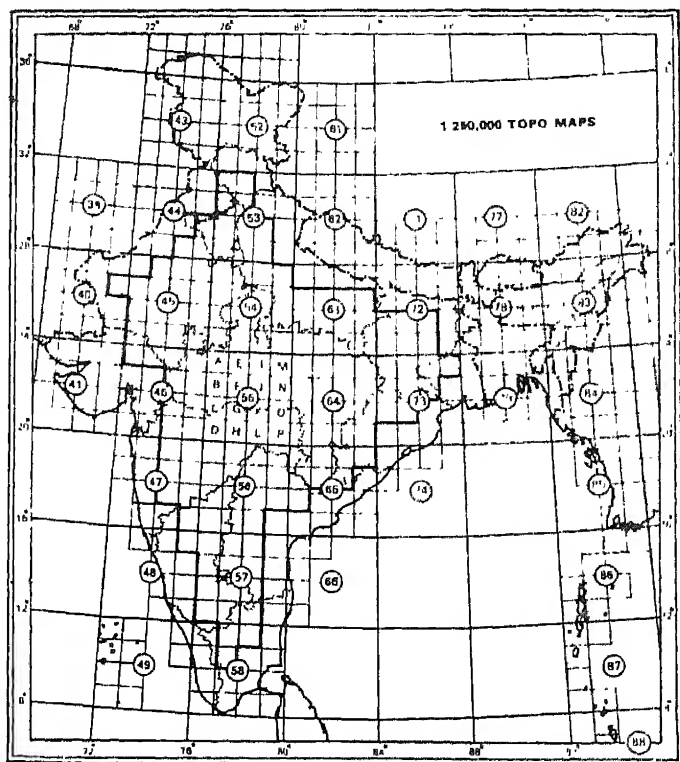


Fig. 15.

which approval of the Survey of India may be obtained.

All the maps of India, its states and districts used in schools should be authentic. In order to obtain information about such maps one item viz. "Has the map been approved by the Survey of India?" had been included in the questionnaire sent to manufacturers/publishers/dealers.

USE OF MAPS IN PRIMARY SCHOOLS

Although we usually think first of maps as part of the study of geography in schools we come quickly to recognise how fundamental they are in whole range of human activity. At primary level maps are useful in teaching environment to children. The NCERT have developed guidelines for developing curriculum at the primary stage. In classes I & II the child is to be introduced to the environment as a whole without making any distinction between the natural, physical, social and cultural aspects of environment. Since children in Classes I-II are too young to understand messages through the medium of maps, they are not particularly useful for them. In classes III-IV two areas of study i.e. Environmental studies I (Social Studies) and Environmental Studies II (General Science) have been suggested as two separate curricular areas. The content for grade III may include the world we live in, our country and state, life in our district and life in different parts of our State. The content for class IV may include India's physical features, resources and their development, means of transport and communication and life in different parts of the country. The content for class V may include the study of map of the world and its major problems. The content in classes VI—VIII may comprise the study of history, geography, civics and contemporary issues and problems. For this purpose all types of maps of world, India, states and districts are useful. Hence information about the contents of maps viz. political, physical, agricultural, mineral, forest, industry, irrigation, transport and others was collected through our questionnaire. This information is as follows:

SCHOOL ROOM WALL MAPS

Political and physical maps of India, world and Asia are available in English, Hindi as well as in all the regional languages. Generally seven to nine colours are used in them. They are approved by the Survey of India. The maps in respect of Africa, North America, South America, Europe, Australia do not seem to have been approved by the Survey of India.

Political maps of foreign countries like Bangla Desh, Nepal, Burma, Afganistan and Pakistan, and China are also approved by the Survey of India. They are available in English and Hindi only. The maps of other countries like USSR, USA, United Kingdom, Sri Lanka, are available in English as well as in Hindi but do not seem to have been approved by the Survey of India. Maps of a few other countries are available in English only. Similar is the case of physical maps of these countries & regions.

Maps of different states as mentioned below are available in English and in the regional languages of the State.

Assam	English or Assamese
Andhra	English or Telugu
Bihar	English or Hindi
Delhi State	English or Hindi
Gujarat	English or Gujarati

Kerala	English or Malayalam
Karnataka - Political	English or Kannada
M.P. - Political	English or Hindi
Maharashtra - Political	English or Marathi
Maharashtra - Physical	English or Marathi
Orissa	English or Oriya
Rajasthan - Political	English or Marathi or Hindi
South India	English
Tamilnadu - Political	English or Hindi or Tamil
U.P. - Political	English or Hindi
West Bengal	English or Bengali
Himachal Pradesh	Hindi
Jammu & Kashmir	English or Hindi
Punjab	English or Punjabi

Maps of districts have not been reported by the manufacturers/dealers. However, district maps can be supplied only on specific bulk order to the manufacturers.

MAPS IN SERIES :

Series of maps on India, Asia, Africa, world and life on foreign lands are available mostly in Hindi & English only. The popular series and the languages in which they are available are mentioned below.

MAPS OF INDIA : (English, Hindi and all regional languages)

India Agriculture
 India Minerals
 India Industries
 India Irrigation & Power Projects
 Our India Pictorial

INDIA CULTURAL :

India New Pilgrimages
 Swatantra Bharat Ka Itihas
 India Climate & Rainfall - Summer
 India Climate & Rainfall - Winter
 India Annual Rainfall
 India Population
 India Roads
 India Soils
 India Natural Vegetation
 India Railway (English only)
 Indian Railway (English only)

MAPS OF ASIA : (Hindi or English)

Asia Political Approved by Survey of India
Asia Physical Approved by Survey of India
Asia Pictorial
Asia Product and Commercial
Asia Population
Asia Climate & Rainfall Summer
Asia Climate & Rainfall Winter
Asia Nature Vegetation

MAPS OF AFRICA : (Hindi or English)

Africa Political
Africa Physical
Africa Population
Africa Climate & Rainfall May to October and November to April
Africa Annual Rainfall
Africa Natural Vegetation
Africa Natural Regions

WORLD PHYSICAL GEOGRAPHY : (Hindi or English)

World Political (Approved by Survey of India)
World Physical (Approved by Survey of India)
World Annual Rainfall (Approved by Survey of India)
World Rainfall May to October
World Rainfall November to April
World Population
World Natural Regions
World Natural Vegetation
World Pictorial
Mankind of the World
World Agriculture I - II
World Industries I - II
World Mineral I - II

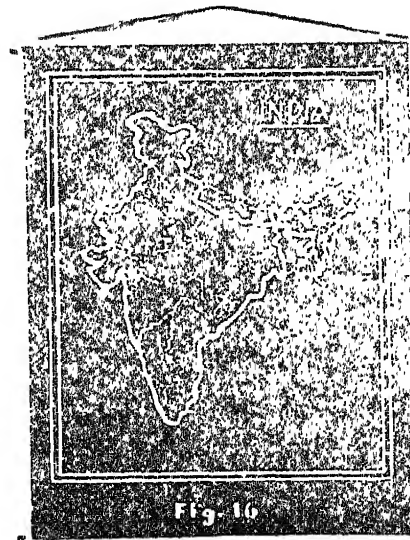
LIFE IN FOREIGN LAND (Hindi or English)

1. Eskimo
2. Balis
3. Japan
4. Red Indians
5. Kirgiz
6. Saudi Arab
7. China
8. Nepal
9. Tibbet

10. Burma
11. Ceylon
12. Afghanistan
13. Australia
14. Central Africa
15. Java
16. Egypt
17. Siam (Thailand)
18. Switzerland
19. Iran
20. Scandanavia
21. Italy
22. Spain
23. Hungary
24. Belgium
25. Yugoslavia

OUTLINE MAPS :

Outline maps painted on thick jet black PVC sheet, of India, world, Asia, Europe, North America, South America, Australia, are also available, (See Fig. 16). They can be made on any country and state of India on demand.



RELIEF MAPS

Three dimensional raised relief plastic maps of India are useful for teaching children. (See Fig. 17) Such maps are nowadays available with a hard



Fig. 17.

packing in a fine frame and hanging hooks. They are weather proof and washable with a markable surface. They are available in sizes of 33 X 47cm and 75 X 100cm in Hindi and English. The firms have not reported as to whether they have been approved by the Survey of India. However, the Survey of India, themselves have produced relief plastic maps of India - Physical as well as political. They are of sizes 30 X 40cm. They have also produced a relief route map from Rishikesh to Badrinath - Kedarnath.

PRICE RANGE OF MAPS :

Maps are printed in maplitho paper, mounted on cloth, varnished and fixed with wooden roller. The price of a map depends upon the size and quality of paper, cloth, wood etc. used on it. The price range of different sizes of maps have been found to be as in the table given below.

Table 2

Price Range of Maps

<u>S.No.</u>	<u>Material</u>	<u>Size</u>	<u>Price Range</u> Rs
1.	Printed on maps litho paper in about seven colours, mounted on cloth varnished and fitted with wooden rollers.	100X150cm	25-30
		100X75cm	12-16
		50X75cm	7-8
2.	Outline maps on PVC sheet	100X68cm	23-25
		100X135cm	40-45
3.	Relief maps	33X47cm	90
		75X100cm	390

MAPS PUBLISHED BY THE SURVEY OF INDIA

Any inquiry about maps may be addressed to the Surveyor General of India Hathibarkala, Estate, Post BOX No.37, Dehra Dun - 248001. As regards maps published by the Survey of India, they may be purchased from authorised Maps Sale Agents in important cities and towns and can also be obtained from:

1. Offset-in-Charge, Map Record and Issue office, Map Publication Directorate, Survey of India, Hathibarkala, Estate, New Cantt Road, Dehra Dun -248001, (Main supplier of maps).
2. Office Superintendent, Map Sales Office, Survey of India, Janpath Barrack 'A', First Floor, New Delhi - 110001.
3. In-Charge Map Sales Office, Southern Circle, Survey of India, No.81 Richmond Road, Bangalore - 560025.
4. Director, Eastern Circle, Survey of India, 13, Wood Street, Calcutta-700016.
5. Incharge, Map Sales Office, Survey of India, 'B' Block Huda Complex Taranaka, Hyderabad-500027.
6. Director, South Eastern Circle, Survey of India, 83-A, B.J.R. Nagar, Bhubaneswar-751014.

7. In-Charge, Map Sales Office, C/O 89(P) Party (CC), Survey of India, E-6/1, Arera Colony, Bhopal-468014.
8. In-Charge, Map Sales Office, C/O 91 Party(NC), Survey of India, 3, Gokhale Marg, Lucknow-226001.
9. In-Charge, Map Sales Office, C/O 9 D.O.(NWC), Survey of India, S.C.O No.48, Sector 26, Chandigarh-160026.

Printing of all geographical maps, bulk of topographic and extra-departmental maps and sundry paid for jobs is carried out in the Map Publication Directorate, which also controls the Map Record and Issue Office at Dehra Dun. In addition, this Directorate is also responsible for certification of external boundaries and coastlines of India, appearing on all private and official publications and also for transliteration of names. For further inquiries one should write to :

The Director, Map Publication, Survey of India, Hathibarkala Estate,
Post Box No.28, Dehra Dun - 248001.

CHAPTER III

GLOBE

INTRODUCTION :

Globes are spherical models of earth. They convey the concept of earth's roundness. Globes are the most accurate maps we have of the world as a whole. A good globe has four properties or qualities : area, distance, direction, and shape of land and water regions on all parts of its surface are shown correctly. It is in these respects that a globe is an accurate map of earth's surface.

There are various sizes and types of globes. Size is usually indicated in terms of diameter. The most common sizes are 15,20,30 and 35cm. The 15cm globe is suitable only for individual study, the 20cm globe is mostly used for small group study and globes of 30cm and beyond are used for classroom teaching

Four types of globes are useful for schools : physical, political, physical & political, and outline globes. Physical globe outlines land and water areas, using different colours to show varied elevations on land and varied depths of the sea. This type of globe is useful to study the contours and topographic features of the earth. They have practical use in grades III and above.

Political globes are designed primarily to show the location of national limits and boundaries of countries to distinguish one nation from another. States, principal cities, trade routes, and other features created by men are located with lines and dots. This type of globe becomes outdated through changes in national boundaries or political affiliations.

Physical-Political Globe combines land elevations, ocean depths and political divisions to enable the students to see where countries and cities are located and also to understand the topographical features of land areas. This type of globe is the most popular for classroom use. A simplified globe of this type with minimum details is desirable for use in primary grades. If the flat maps that are used later on, have identical colours, the transition to flat maps will be easier for the young learner.

The outline globe is of great value at all grade levels. Teachers and students can write on it with chalk, indicating such features as locations, air, sea and land routes and great circles. Psychologically the unique advantage of this globe is that it permits attention to be focussed on one thing at a time. In addition, it is particularly well suited for direct pupil activity and experience. Globes of this type are available with the continents outlined and with grid lines as well as plain surfaces. It permits teachers and students to write on this type of globe with chalk or felt pen, indicating such features as locations, air,

sea and land routes, directions, mineral deposits, war zones etc. Since outline globes are less costly to manufacture than those with printed surface, these globes are relatively inexpensive in proportion to their size.

TEACHER MADE GLOBES .

Innumerable primary schools in India are situated in far flung rural, tribal and hilly areas where supply of teaching aids is difficult to maintain. One way to implement successfully the project "Operation Blackboard" is to involve the teachers in the development of teaching aids. For developing a globe, the former Department of Teaching Aids had produced a monograph explaining a few easy steps. They are stated below :

To make a globe, a teacher may collect the following items .

1. Scraps of newspaper
2. Bladder
3. Glue
4. Dish and water

First of all the base for moulding the hollow sphere of scraps of paper is made. This is done by :

- i) Inflating the bladder to its maximum capacity (Fig 18).
- ii) Fastening the nozzle tightly (Fig 19) and
- iii) Checking up the air leakage by dipping it into water (Fig 20)

To mould the hollow sphere, one layer of waste paper scraps of waste soaked in water are put on the inflated bladder and pressed properly. (Fig 21)

Then atleast six other layers of paper scraps with gum are pasted after the previous layer has dried (Fig 22)

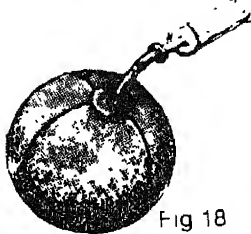


Fig 18

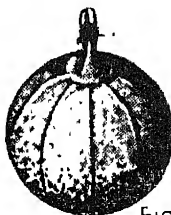


Fig 19

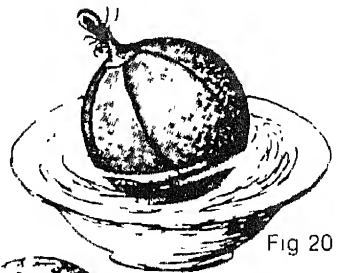


Fig 20

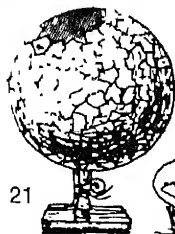


Fig 21

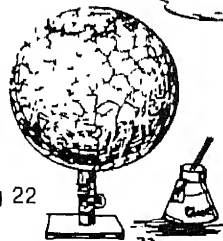


Fig 22

After the layers have dried and become hard the air from the bladder is discharged and the bladder is pulled out of the sphere (Fig 3). A piece of reel is fixed with glue into the opening of the sphere (Fig 24). One more hole is punched diametrically opposite to the first. The surface is smoothed with a fine sand paper. The lines of latitudes and longitudes are marked on the sphere with the help of a thread. Thereafter outlines of the world map are drawn. The desired details are added in ink and colours. One coat of copal varnish is given to protect the globe from moisture.

A stand is made with the help of a 48" long wire (Fig 25). This wire is twisted along the arrow marks as shown in the diagram by passing into a hole (Fig 26). Thereafter a rubber ring is fixed on this stand. Then the globe is put on this ring by passing through the wire (Fig 27). A round

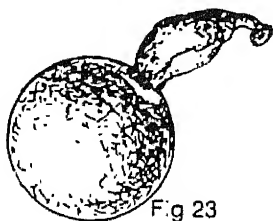


Fig 23

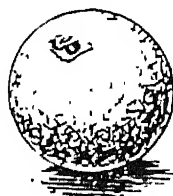


Fig 24

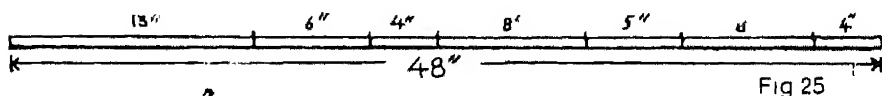


Fig 25

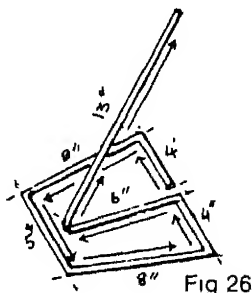


Fig 26

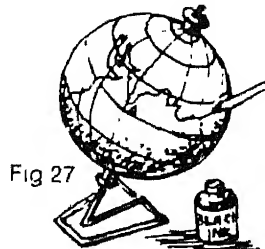


Fig 27

knob is fixed at the top. It does not allow the sphere to come out and makes it easy to handle the globe.

Under the Programme of Action for Implementing National Policy on Education (1986), it has been suggested that the capacity available in polytechnics, ITI's, secondary and higher secondary schools may be geared to produce teaching aids. It is suggested that above mentioned globes may be developed through vocational training assignments to students of secondary and higher secondary schools.

AVAILABILITY OF GLOBES :

Information was called for in respect of the three types of globes viz. political, physical, and outline globes. The globes are generally made of pressed carboard with metal arc stand. The globes are also made of paper mache and plastics. Some plastic globes are inflatable.

Sufficient progress has been made in the manufacture of globes on which information is provided with attractive multicolours and printing is done in English, Hindi and all the regional languages. They are approved by the Survey of India. Ocean relief is shown in many shades of blue, woodlands in light to dark tones of green, yellow steppes and deserts, and white arctic ice. Cartographic work is done with excellence by use of latest technologies. Meridian and other imaginary lines are shown in white silky or gold colour with embossed graduation at appropriate places. Some globes are luminated. A two-in-one globe is such that it is a physical globe but as soon as the light is switched on it becomes political. A three-in-one globe is such that on switching the light on, a physical globe not only becomes political but at the same time capital cities of all the countries of the world are lit up.

All the manufacturers have stated that they can manufacture and supply globes in as many quantities as called for.

PRICE RANGE OF GLOBES

Prices of globes vary a lot. A few firms have quoted prices of ordinary and high quality globes separately. The price range of different types of globes quoted by the dealers/manufacturers are given below in Table No.3.

Table 3

PRICE RANGE OF GLOBES

S No	Material	Size	Price range in Rupees	
			Ordinary	High quality
1	Globe Political/Physical of pressed cardboard with metal arc and stand	20cm	30-35	60-80
		30cm	40-45	110-120
		35cm	50-60	140-150
2	Globe Political/Physical of plastic which can be inflated like balloon(English only)	20cm	90	
3	Globe Political/Physical of solid plastic (English only)	20cm	225	
		26cm	325	
		30cm	525	
		37cm	875	
4	Solid Globes with light. These globes are physical but when light is on they become political (English only)	20cm	425	
		28cm	775	
		30cm	975	
		37cm	1150	
5	Globe Black surface outline of pressed cardboard with metal arc and stand	30cm	20-25	80-90
6	Globe Black surface outline made of paper mache and wire to clear the concept of latitude and longitude	30cm		100

SELECTION OF GLOBES

In 1986, a Committee was nominated by the Joint Director, C.I.E.T., to suggest the purchase of suitable globes for use in some selected schools in India. Quotations on all India level were invited. The following eight Indian companies sent quotations valid upto March, 1986 as well as a few sample of their globes.

1. Bharat Educational Stores(Regd), Meerut
2. Vidya Chitar Prakashan, New Delhi.
3. Prem Educational Stores, New Delhi.
4. Chandy Charan Dass & Co. Pvt. Ltd., Calcutta.
5. Clifton & Co. Pvt., New Delhi.
6. All-India Educational Supply Company, New Delhi.
7. N.C. Kansil & Sons, New Delhi.
8. Bombay Stationery Mart, Bombay.

The Committee examined the globes and the quotations and suggested the following globes for purchase for any school with the remarks mentioned under them.

1. Rico Italy made non illuminated globe : This globe measuring 30cm is supplied by Bharat Educational Stores. It is weatherproof and washable. Its quality is also good because printing has been done on the metallic base. Its price viz. Rs.260/- in 1986 was also considered reasonable. It will be durable also. As such it was considered as No.1 for purchase if it was agreed to purchase foreign made globes. It was, however, necessary to obtain certificate that the globe has been approved by the Survey of India.

2. Globe made by Chandy Charan Dass & Co.. This globe measuring 30cm is made of straw and chrome board. It is made in India and its price was Rs 140/- (taxes extra) in 1986. Of all the Indian made globes, this was considered No 2 in printing because its finishing was better than others. Its price was comparatively less than quoted by others for the same make and material.

3. Globe made by N.C. Kansil and Sons : This globe measuring 30cm is made of cardboard with chrome plated steel stand. It has been duly certified by the Survey of India. Its price was Rs.89/- (taxes extra) in 1986. Keeping in view its quality viz-a-viz price, it was put at No 3, for purchase purposes.

CHAPTER IV

CHART

INTRODUCTION

Charts are combinations of such pictorial, graphic, numerical, or verbal materials which, together, are most likely to present clear visual summaries of important processes or relationships. Therefore, they can be helpful in the classroom situation in providing indirect purposeful experiences which can be supplemented by providing on the spot study and explanation for gainful learning, wherever possible

The term chart can be applied to several different types, and any classification system for charts must be arbitrary. They may be classified according to use, function or similarity of construction. Specific charts can be designed for special purposes, for instance, a reading-readiness chart to assist reader to associate words with pictures or symbols of recallable experiences or a word-reading chart to motivate group practice in reading and to assist in developing eye-fixation movement skills. The classifications of charts derive from their function than from the kinds of visual or verbal materials used on them. One graphic aids expert identified some 50 different classifications of charts in the functional context.

PURPOSES OF CHARTS

1. To show relationships by means of pictures, symbols, facts, figures or statistics.
2. To present materials symbolically.
3. To summarize information.
4. To show continuity in process
5. To present abstract ideas in visual form.
6. To show the development of structures.
7. To create problems and to stimulate thinking.
8. To encourage use of other instructional materials.
9. To motivate student's desire to continue related research.
10. To attract and concentrate attention.

CHARACTERISTICS OF CHARTS

1. They must be simple and present one main idea.
2. They must be large, uncrowded, and easy to read.
3. Colour should be used when appropriate, to emphasize key ideas.

TYPES OF CHARTS

A large variety of charts are available for classroom purposes, we need to know the following:

1. Flow Chart.
2. Data Chart.
3. Sequence Chart.
4. Strip Chart.
5. Flip Chart.
6. Experience Chart.
7. Comparison and Contrast Chart.

FLOW CHART

The flow chart represents ideas which move along in a sequential manner in order to reach a specific objective in relation to data presented. It shows the structure of an organization or the development of a process. Flow charts may be classified into four categories :

- (a) *Stream chart* - It takes the name from its appearance and its relationship to the natural flowing of a body of water from its tributaries to the main stream. The stream chart starts out with a number of branches and gradually reduces them to a point where the branches flow into a main stream. The stream chart is useful in showing competitive events which involve a number of individuals and result in a lone final winner.

A stream chart may also be used to show how a car is produced by bringing together on an assembly line a series of parts - engine, chasis, body, tyres, etc. It may also represent the steps that are required to reach a certain objective. (Fig 28)

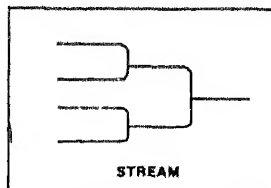


Fig 28

(b) **Tree chart**- It is somewhat similar to the stream chart in its construction. However, it most often assumes a vertical rather than a horizontal format and takes its name from its appearance to a naturally growing tree. The chart is useful in showing development, growth and change by beginning with a single source (the trunk) which then spreads out into many branches. The genealogical tree is a familiar example of the tree chart. The tree chart is also suitable for showing the many by-products obtainable from coal, peanuts, corn, wood, petroleum, or from rubber. Sometimes a reverse form of the tree chart is useful in showing how a great variety of elements are combined to form one product. The reverse of the tree chart is the organization chart. (Fig 29)

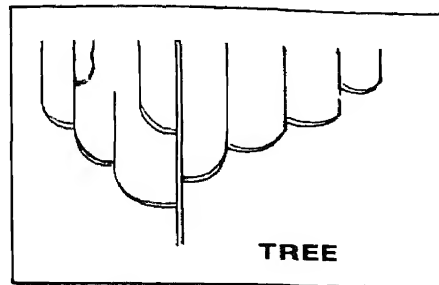


Fig 29

(c) **Organization chart** - It is frequently used to show line and staff working relationships. The chart generally has the appearance of a number of blocks with titles of positions connected by lines to show the flow of responsibility within an organization. Such a chart is useful in showing how a company, school, government or other body has organized itself for function. Organization charts are simple to create, but they have limited use, depending on the reason for which they were created.

Dynasties are sometimes presented in organizational chart manner to show succession of political power over hundreds of years. (Fig 30).

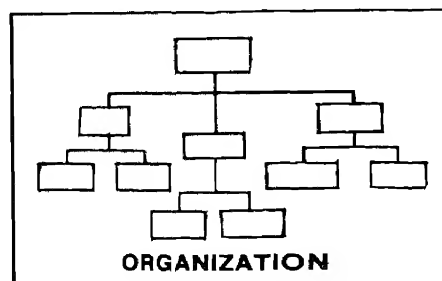


Fig 30

- (d) *Process chart* - It shows how a product is made or the sequential steps which one must go through in learning how to perform a particular task. This type of chart is most useful in showing the development of a manufactured item. For example process chart may show the stages of manufacturing sulphuric acid or it may trace the steps a legislative bill follows from its inception to its becoming a law. It may picture the sequence to follow in cooking rice or in cutting and sewing a dress. Because it has varied applications, the process chart is one of the most useful in education. The process charts can also be used for explaining natural process like carbon cycle and nitrogen cycle. (Fig 31)

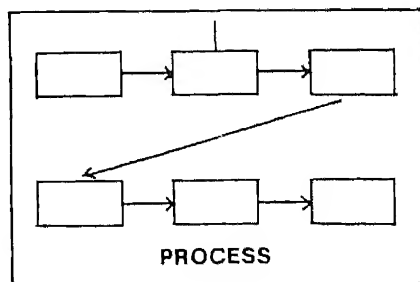


Fig 31

DATA CHART

It represents summarization of tabulated information. These charts are defined as having three different formats :

- (a) *Time chart* - It is developed to show the occurrence of events over a long period. The event may be depicted on a scale, either vertically or horizontally showing dates and using pictures or words to describe the event. A number of variations of the time chart may be utilized. These would include pictures of major events within a specific period of time, overlapping lines to show the relationships of people's lives to a particular period of time, or the chronological listing of events as they have occurred in history. Time chart is very effective in putting historical events in proper relation to each other. It is only when a student has events well related that he really understands how one act in history tended to cause certain results. This understanding of cause and effect is the basic reason for studying the past. It can also be used effectively for comparing, say wheat production of a number of countries at 25-year intervals from 1875 to 1975.

This institution has developed prototypes of three illustrated history charts depicting ancient Indian civilisation. Each chart contains eight bands covering ancient places, important personalities in ancient India and cultural and educational centres etc. (Fig 32)

A History Package

TIME HISTORY CHART-1

ANCIENT PERIOD



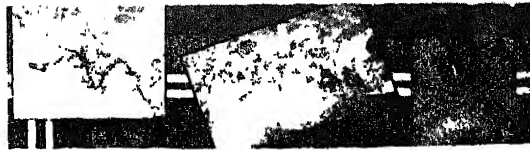
HARAPPAN CULTURE



THE ARYANS SETTLE
IN INDIA



MAHABHARATA WAR



CITIES OF THE GANGES
VALLEY



BUDDHA — FOUNDER OF
BUDDHISM



MAHAVIRA — FOUNDER OF
JAINISM



THE CODE OF MANU



MEGALITHIC CULTURE
OF SOUTH INDIA

Fig. 32.

(b) *Tabular chart* - It is created to summarize information about a particular idea. It may be taken on a variety of appearances. The drawing diagrams with labels for the various points of an object or process may be utilized. A tabular chart is one of the most useful in that it can present large amount of information summarized in a variety of ways. Railroads, bus and plane time-tables in compact form are examples of this type of chart.

(c) *Outline chart* - It is used, primarily, to show an idea as skeleton sequence listings to reflect the breakdown of an idea from its major to its lesser components. Outline charts as compared to other data charts have somewhat limited but essential use in certain areas of the curriculum.

SEQUENCE CHARTS

They may represent variations of flow or data charts and primarily reflect utilization rather than an entity. A specific characteristic of the sequence chart is presenting ideas in a chronological manner.

STRIP CHART

It reflects basically a technique of covering up the information on the chart and revealing it by removing one strip at a time. Strips may be made of paper or lightweight cardboard so that they may be removed easily without disturbing or tearing the original material. Strip charts are particularly helpful if in a long listing of ideas, it is desired to reveal only one idea at the time of discussion.

FLIP CHART

It is used when there is a large body of information which cannot be contained in one chart, but rather must be communicated through a series of charts. The common practice of one basic idea per chart prevails, and they are shown in sequence until the series is finally revealed. To make a flip chart, take several sheets of chart paper or newsprint of the same size and draw appropriate visuals or written materials on each. Fasten the sheets together at the top with metal or wooden strips - one on the front and one on the back for ease of flipping and to serve as an aid in storage. Mount the supporting strips to the top of an easel. (Fig 33)

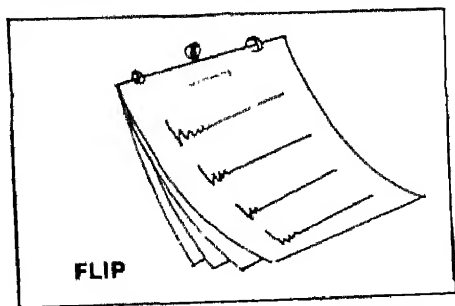


Fig 33

EXPERIENCE CHART

Its main use is in primary schools. It is used by the teacher to get students to express ideas about experiences which they may have had in their daily activities. Such charts may be used to describe events of a field trip, causes and effects of weather, or experiences during a particular classroom activity. The events are listed on the chart sequentially as they are described by the student, but in its final state, the chart may not show an exact chronology of events. The experience chart is usually developed on the spot with teachers and students interacting in its development. The charts may be kept for later use, but is generally considered to be of short term use and has its basic application and impact at the time that it is created in the classroom.

PREPARATION OF CHARTS

Hints for Producing Charts

1. Strive for simplicity.
2. Arrange illustrations in an arresting and pleasing manner.
3. Use colour for definition and emphasis.
4. Design material to be as illustrative as possible in order to avoid detailed printed explanations.
5. Use numbers and a legend where detailed labelling is required.
6. Plan chart size to accommodate the maximum viewing distance. This would generally be about thirty feet. Letters should be at least one-inch high to be legible at this distance. Common sizes of charts are Imperial size 30" X 22", Crown size 30" X 20", and the A 1 size 33" X 23½".
7. Check the content for technical accuracy.

Teachers and students can easily make charts from the material available in the immediate environment like chart paper, poster colours, brush, and ink. They can also take the guidance of subject expert available in the vicinity. It is worth while to associate an art teacher or good art student in production of charts.

The Central Institute of Educational Technology by adopting the following methodology has produced a number of charts for clarification of concepts and illustration of events and natural phenomenon. First of all a workshop consisting of subject experts, teachers of the concerned class, visualisers and artists from C.I.E.T. is conducted to identify the topics or themes which need the help of a chart for clarification of concepts in teaching learning situation. Then this group works for development of scripts indicating the verbal and visual information to be incorporated in the chart. Its layout is also discussed and planned. After a consensus has been arrived at, rough chart is developed and discussed in the group. Thereafter, the modifications

accepted in the group meeting are incorporated in the charts which are later on evaluated. Amendment approved, if any, in the evaluation meeting are further incorporated in the charts resulting in preparation of prototypes. The prototypes are duplicated by photographic methods or through off set printing process for sending copies to all the State Governments and Union Territories. In this way a series of history charts, biology charts (Series I) physics and geography charts have been produced by the institution.

AVAILABILITY OF CHARTS

Replies have been received from thirty eight firms/Government offices in response to the questionnaires sent by us. Fifteen firms out of the thirty eight have stated that they deal in charts. Charts are available for almost all the subjects e.g. Social Studies, Botany, Zoology, Physics, Chemistry, Mathematics, Language, Geography, History, Physiology, Health, themes of national importance, Yoga and morals etc. Their prices have been quoted from rupees three upwards depending upon the size, quality & quantity of raw material used and the number of colours used. The price is also negotiable depending upon the quantity to be purchased. Some firms have stated that their charts have been tried on target audience and found suitable whereas other firms have stated that their charts have not been tested.

The charts are generally available in size 50 X 75cm, 37 X 50cm, 75 X 100cm, 56 X 90cm, 90 X 110cm, and 100 X 150cm, etc. They are available in loose sheets as well as in sets of Three, Four, Seven, Ten, Twelve and Sixteen, etc. They are available in different languages like Hindi, English, Gujarati, Kannada, Marathi, Tamil & Telugu, etc. According to the information received, charts on following subject areas/topics are available with the suppliers. They can also prepare charts on demand in bulk.

SOCIAL STUDIES

Our Country	Duties Towards Home and Family
Our Town and Village	Duties Towards our School
Our People	Duties Towards our City or Village
Our Government	Duties Towards our Country
Our Birth Right	Duties Towards our Government
Our Home	Flags of All Nations
Road Sense	Seven Wonders of the World
National Anthem	Races of People
History of National Flag	Dances and Festivals
Conventional Signs	Indian Sculpture
Duties Towards ourselves	Animals

Birds	How a national law is passed
Vegetables	Directive Principles of our Constitution
Fruit	The Race Ancestry of the People
Fishes	The Charter of Citizenship
Flowers	The Emancipation of Nation
Transport	Earth and its Motion
Historical Buildings	Heavenly Bodies
People of India	Structure of Earth
Children of World	Rocks and Soils
Temples of India	Atmosphere and Space
An ideal boy	Pressure and Wind
Citizen's Creed and its observance	Weather Map Symbols
The Flag-Emblem and Anthem	Ocean Hydrosphere
People's Government-Union Parliament	Surveying
People's Government-State Legislature	Map Projection
Judicial Branch of National Government	Birth of Earth & Its Evolution
Local Self Government Institutions	The Story of Man
Legislative Powers of Government	Wonders of the World

CHARTS IN SETS IN SOCIAL STUDIES

Indian Civilization through Ages	(10 Charts)
Ancient World Civilizations	(10 Charts)
Struggle for Indian Freedom	(15 Charts)

SCIENCE

Air	Living Things	Atom
Earth	Magnetism	The Skeleton
Electricity	Sound	Muscles
Forces & Measurement	Water	Brain and Nervous System
Heat	Space Travel	Circulation of Blood
Light	Life in Sea	Digestive System

Structure of Ear	Respiratory System	Heart
Structure of the Eye	Skin and Excretory System	Circulation of Blood

MATHEMATICS

Numbers	Division
Additions	Numericals
Substraction	Roman Figures
Multiplication	Modren Mathematics

PRICE RANGE OF CHARTS

<u>S.No.</u>	<u>Material</u>	<u>Size</u>	<u>Price</u>
1	Paper Sheet with Tin binding	50X75	Rs.3.00
2.	Mounted on cloth with wooden roller and varnished	50x75	Rs.8 00
3	Mounted on cloth with wooden roller and varnished	75X100	Rs 16.00
4	Plastic laminated with plastic rollers	50X75	Rs 8.00
5	Set of 10 charts on paper sheet only	50X75	Rs 30 00
6.	Set of 10 charts mounted on cloth	50X75	Rs.60 00

Appendix

ADDRESSES OF DEALERS/MANUFACTURERS

S. No.	Address	Black- Board	Chalk	Duster	Map	Globe	Chart
1.	All India Educational Supply Co., Sri Ram Building, Jawahar Nagar, Delhi - 110007.	"	"	"	"	"	"
2.	Amar Chalk Industries, D-41, MIDC, Ratnagiri-415639.		"				
3.	Art Union, 165-Sri Arabinda Sarani, Calcutta-700006.	"	"	"			
4.	Art Stationers & Printers, " 44/IB Beniatola Lane, Calcutta.			"			
5.	Arvind Udyog, Jatharpeth Road, Akola.	"			"		
6.	B.S. Enterprise, 18-B, Braja Nath Dutta Lane, Calcutta-700012.	"		"	"		
7.	Bepin Bihari Dass & Sons, 63,Radha Bazar Street, Calcutta-1.	"		"			
8.	Bharat Educational Stores, Chhipi Task, Meerut-250001(U.P.).	"		"	"	"	"

9.	Bio Visual Products, 217 Cycle Market, Jhandewalan, New Delhi-110055.	"	"				
10.	Bombay Stationery Mart, 7/A Phirozeshah Mehta Road, Fort, Bombay.					"	
11.	Bombay Stores, M.G Road, Ratnagiri.			"	"	"	"
12.	Capital Map Co., 11-A, Prehlad Market, Karol Bagh, New Delhi-110005.	"		"	"	"	"
13	Chandy Charan Dass & Co. Pvt. Ltd., 150 Lenin Sarani, (Dharmatala Street), Calcutta-13.				"	"	"
14.	Clifton & Co. Pvt. Ltd. 53/2 Desh Bandhu Gupta Road,(Opp. Prahlad Market Bus Stop), Karol Bagh, New Delhi-110005.	"	"	"	"	"	"
15.	Educational Stores, H-44 Navin Shahaara, Delhi-110032.	"			"		
16	Gay de Fumbruno. Raj Singh, 111/10 111/10 Block, 111/10	"					

17.	Garg Industries, Saproon (Solan), Himachal Pradesh.	"				
18.	International Publications, 42, South Basti Harphool Singh, Sadar Thana Road, Delhi-110006.	"	"	"	"	"
19.	K.B. Educational Traders, S/3 West Patel Nagar, New Delhi-110008.	"	"	"	"	"
20.	Modern Publishing Co., 2C/39, New Rohtak Road, New Delhi-110005.	"		"	"	"
21.	M.S.S.I.D.C. Ltd., Jail Road, Ratnagiri.	"				
22.	Narayan Plaster Works, South Gaighat Gali, Patna-800 007.	"	"	"	"	"
23.	Narayani General Stores, M.G. Road, Ratnagiri.			"	"	"
24.	N.C. Kansil & Sons, Kansil Bhawan, Model Basti, New Delhi-110006.	"	"	"	"	"
25.	Neelam Furniture Industries, The Mall, Solan, Himachal Pradesh.	"				

26.	Orient Educational Store, 7/33, Ansari Road, Darya Ganj, New Delhi-110002.	"			"		"
27.	School under the General Education Dept., Kerala	"			"		"
28.	Shramanti Chalk's Industries, Kokulnagar, Gadchirdi, Madhya Pradesh.						
29.	Shriram Cottage Industries, Chokhi, Dist. Buldana.	"					
30.	Southern Stationery Stores, Balaji Chowk, Sangli.						
31.	Surendra Fabricators, Saraswati Vihar, Awdhootwadi, Yavatmal-445001.	"	"	"	"	"	"
32.	Tamilnad Scientific Emporium, 71 R.H. Road, Malapore, MADRAS-4.	"		"	"	"	"
33.	Tanavade and Sons, Main Road, Sangli.	"		"			

34. 1/i
1, National Institute of Education
Darya College,
New Delhi-110002.

35. Vigyan Modellers,
10685-86, Manak Pura,
Karol Bagh,
New Delhi-110005.

" " " "

36. Vijay & Company,
85-A, Model Basti,
New Delhi-110005.

"

"

37. Surekha Educational
Products,
Pannalal Nagar,
Amravati.

"

38. Yash Shri Agency,
Masarekar Nagar,
Ratnagiri.

"